

Table showing for the month of December, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Amt.	Year.	Amt.	Day.	Year.	Amt.	Time.	Day.	Year.
<i>Pennsylvania—Continued.</i>									
Newtown.....	Inches.		2.77	27	1839	Inches h. m.			
Pittsburgh.....						1.30	1 00	26	1875
Quakertown.....			3.38	16-17	1888				
Tarentum.....			3.00	10	1878				
West Chester.....			3.76	17	1888				
Westtown.....			3.12	17	1888				
Wellsborough.....			3.46	6	1884	1.20	0 20	7	1884
Do.....			2.50	13	1885				
<i>Rhode Island.</i>									
Providence.....	7.80	1884							
<i>South Carolina.</i>									
Brewers Mines.....			2.63	17	1888				
Charleston.....	9.68	1844	2.54	25	1873				
Do.....			3.46	9-10	1885				
Do.....			3.08	23-24	1887				
Hacienda Saluda.....			5.00	27-29	1875				
Hardeeville.....			3.54	24	1887				
Statesburgh.....			3.65	5-6	1884				
<i>Tennessee.</i>									
Ashwood.....			2.70	31	1887				
Austin.....	10.20	1879							
Clarksville.....	11.48	1858	2.50	1	1878				
Charleston.....			3.38	21	1884				
Chattanooga.....			3.10	10-11	1879				
Do.....			3.08	21-22	1881				
Cleveland.....			3.16	3	1874				
Cookville.....			2.97	31	1887				
Flat Creek.....			2.62	21	1884				
Florence Station.....			2.96	31	1887				
Fostoria.....			2.85	21	1884				
Do.....			3.00	31	1887				
Greensville.....			3.00	5	1886				
Grief.....			1.70	21	1884				
Hohenwald.....			2.54	31	1887				
Jonesborough.....			3.00	5	1886				
Knoxville.....			3.48	19-20	1872	1.10	0 45	4	1873
Do.....						1.03	0 30	26	1875
Lawrenceburgh.....			3.88	31	1887				
Memphis.....			3.00	29-30	1884				
Parksville.....			2.72	21	1884				
Riddleton.....			2.86	31	1887				
Rockwood.....			3.00	21	1884				
Savannah.....			2.58	31	1887				
<i>Texas.</i>									
Austin.....			3.45	8-9	1872	1.05	1 00	4	1879
Brazoria.....			3.49	29-30	1888				
Clarksborough.....	18.50	1876							
Clarksville.....	13.50	1873	8.50	29-30	1874	1.36	0 20	28	1871
Do.....	10.25	1874	6.00	31-1*	1874				
Do.....			3.00	23	1875				
Do.....			8.50	28-29	1876				
Do.....			2.75	3	1877				
Do.....			2.50	13	1881	2.50	2 30	13	1881
Do.....			2.66	12	1885				
Corsicana.....									
Fort Clark.....	23.03	1857							
Fort Graham.....	11.03	1850							
Fort Worth.....			2.50	25	1888	2.50	2 30	25	1888
Fredericksburgh.....			3.40	20	1877				
Galveston.....			4.63	21-22	1875	1.36	0 20	28	1871
Do.....			4.74	19-20	1878				
Do.....			2.72	18-19	1882				
Do.....			4.50	28	1884				
Do.....	10.28	1887	2.90	23-24	1887				
Gilmer.....			3.17	20-21	1875				
Melissa.....	13.50	1873	5.00	27-28	1877				
Do.....	12.00	1877							
Mexia.....			2.50	29	1888				
New Ulm.....	16.43	1875	5.62	3	1875				
Do.....			3.12	21	1875				
Do.....			2.63	24	1875				
Do.....			1.50	31	1875				
Do.....			2.63	20	1877				
Do.....			2.85	12	1885				
Do.....			3.57	10-11	1884				
Palestine.....			2.55	12	1887				
Rio Grande City.....									
San Antonio.....	11.09	1857				1.00	1 00	12	1885

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	Amt.	Year.	Amt.	Day.	Year.	Amt.	Time.	Day.	Year.
<i>Utah.</i>									
Kanab.....	6.50	1872							
<i>Vermont.</i>									
Castleton.....	6.92	1869							
Manchester.....			2.60	17	1888				
<i>Virginia.</i>									
Cape Henry.....			3.07	10	1878				
Lynchburgh.....	11.81	1884	3.17	13-14	1879				
Do.....			4.50	22	1883				
Do.....			6.74	21	1884				
Norfolk.....			2.85	25-26	1872				
Do.....			2.52	10-11	1888				
Rappahannock.....			2.51	20	1887				
Walnut Grove.....			3.00	22	1879				
<i>Washington.</i>									
Blakely.....	17.25	1879	2.50	6	1887				
Bainbridge Island.....	17.25	1880							
Do.....	11.15	1886							
Cape Disappointment.....	10.00	1864							
Do.....	16.12	1866							
Do.....	14.60	1868							
Do.....	11.11	1871							
Cathlamet.....	13.00	1871							
Do.....	20.00	1875							
Dayton.....			3.69	13	1882				
Fort Canby.....	13.54	1880	2.77	18	1884				
Do.....	11.55	1881							
Do.....	12.46	1882	2.58	30-31	1886				
Do.....	10.56	1885							
Do.....	17.35	1886							
Do.....	15.18	1887							
Fort Steilacoom.....	13.01	1857							
Do.....	12.06	1867							
Fort Vancouver.....	13.37	1852							
Do.....	10.77	1855							
Do.....	15.37	1856							
Do.....	12.28	1857							
Do.....	16.04	1867							
Fort Walla Walla.....	12.84	1861							
Neah Bay.....	27.30	1863	3.10	12	1886				
Do.....	14.50	1864	2.83	4	1887				
Do.....	14.00	1865	5.45	16-17	1887				
Do.....	23.22	1880							
Do.....	11.83	1883							
Do.....	13.00	1885							
Do.....	30.70	1886							
Do.....	22.57	1887							
Olympia.....	11.73	1877							
Do.....	11.42	1879	3.60	1	1878				
Do.....	16.66	1880	3.31	30-31	1879				
Do.....	10.32	1882	3.32	18-19	1884				
Do.....	13.38	1886	2.50	30-31	1886				
Do.....	15.75	1887	3.82	6-7	1887				
Pysht.....	11.34	1883							
Do.....	21.61	1886							
Do.....	16.00	1887							
Tacoma.....			2.82	31	1886				
Do.....	11.09	1886							
Do.....	10.26	1887							
Tatoosh Island.....	10.45	1883	2.85	20-21	1884				
Do.....	12.47	1884	2.95	2-3	1886				
Do.....	10.14	1885	4.02	12	1886				
Do.....	25.84	1886							
Do.....	17.47	1887							
Do.....	11.82	1888							
Tatoosh Light-House.....	11.75	1869							
Do.....	16.82	1870							
Do.....	15.75	1871							
Vashon.....	10.07	1887							
<i>West Virginia.</i>									
Helvetia.....	8.81	1881							
<i>Wisconsin.</i>									
Appleton.....	9.29	1857							
<i>Wyoming.</i>									
Fort Fetterman.....	6.02	1872							

* January 1, 1875.

WINDS.

The most frequent directions of the wind during December, 1888, are shown on chart ii by arrows flying with the wind. In the Saint Lawrence Valley, New England, and New York south to west winds prevailed. On the Atlantic coast south of the fortieth parallel, and along the Gulf coast east of the Mississippi, north to west winds predominated. In the Lake region, and the Ohio and lower Mississippi valleys they were generally from south to west; in the upper Mississippi and Missouri valleys from the northwest, while in the Rocky Mountain regions and Texas they were variable. On the Pacific

coast north of the forty-fifth parallel southerly winds prevailed; at Eureka, Cal., the prevailing direction was southwest; at San Francisco northwest; at Los Angeles west, and at San Diego northwest.

HIGH WINDS (in miles per hour).

Maximum velocities of fifty miles, or more, per hour, other than those given in the table of miscellaneous meteorological data, have been reported as follows: Wood's Holl, Mass., 51, ne., 12th; Block Island, R. I., 50, nw., 12th; 60, nw., 18th; Fort Canby, Wash., 56, s. 2d; 60, s., 8th; 54, s., 11th; 69, s.,

12th; 60, s, 13th; 56, se., 15th; 60, se., 25th; Tatoosh Island, Wash., 54, e., 13th; 55, e., 26th.

LOCAL STORMS.

With the exception of a severe wind storm, which presented the characteristics of a tornado, reported by Mr. J. T. Richardson, of Clarksville, Tenn., as occurring south of that place, near Orgain's Cross Roads, on the evening of the 16th, no well-defined local storms have been reported for December, 1888, and the following reports by Signal Service observers generally refer to disturbances incidental to the passage of some of the more important areas of low pressure traced on chart i:

17th. Virginia.—Spottsville, Surry Co.: a severe wind and rain storm occurred in the evening, causing considerable damage to property.—*Report of voluntary observer.*

17-18th. Pennsylvania.—Harrisburg: the severe wind and rain storm was very destructive to property in the Cumberland Valley; several houses were unroofed; barns blown down, and fences demolished. The damage is estimated at several thousand dollars.

21st-23d. California.—Los Angeles: the heavy rains caused several minor washouts on the railroads eastward, slightly delaying trains.

24th. California.—Red Bluff: heavy rain began 10.15 a.

m. and continued, with short intermissions, until 7.42 p. m.; many of the streets and sidewalks were flooded and impassable during the storm. *Florida.*—Micco: rain began during night and ended 4.45 a. m.; in that time 6.33 inches were measured, most of which fell between 12.30 a. m. and 4 a. m.; many washouts have been reported, and several small boats were sunk by the storm.

25th. Kansas.—Leavenworth: a sleet storm began 6.20 p. m.; turned to heavy snow about midnight, and ended during the night. The sleet and snow caused much damage to telegraph and telephone wires, and also delayed trains on all roads leading to this point.

25-26th. Missouri.—Kansas City: a severe sleet storm prevailed during the night and ended 10.45 a. m. 26th. The electric light, telephone, and telegraph wires in the city became thickly coated with ice, and gradually succumbed to its weight, extinguishing the electric lights, and seriously crippling the telegraph and telephone service. The damage done by the storm in this city is estimated at several thousand dollars.

26th. Iowa.—Dubuque: sleet and snow fell throughout the night, and rain and snow fell alternately during the day until 5.50 p. m. Railroad trains were delayed, and the telegraph lines were covered with sleet, interfering seriously with telegraphic communication.

INLAND NAVIGATION.

STAGE OF WATER IN RIVERS AND HARBORS.

In the following table are shown the danger-points at the various stations; the highest and lowest depths for December, 1888, with the dates of occurrence and the monthly ranges:

Heights of rivers above low-water mark, December, 1888 (in feet and tenths).

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River:</i>						
Shreveport, La....	29.9	31	12.8	14	3.7	9.1
<i>Arkansas River:</i>						
Fort Smith, Ark....	22.0	28-29	17.0	7, 8, 12	2.0	15.0
Little Rock, Ark....	23.0	31	17.4	6, 7, 8, 9	3.3	14.1
<i>Missouri River:</i>						
Leavenworth, Kans.	20.0	1	5.2	25	4.0	1.2
Kansas City, Mo....	21.0	1, 2, 4, 5, 6, 7	5.8	25-27	4.7	1.1
<i>Mississippi River:</i>						
Saint Paul, Minn....	14.5	1	2.6	10-11	2.0	0.6
La Crosse, Wis....	24.0	2-3	3.0	12	2.6	0.4
Dubuque, Iowa....	16.0	1	3.0	19-20	1.6	1.4
Davenport, Iowa....	15.0	27	2.5	24	0.5	2.0
Keokuk, Iowa....	14.0	28	2.0	22	0.5	2.5
Saint Louis, Mo....	32.0	31	8.5	25	3.7	4.8
Caïro, Ill....	40.0	1	20.0	16-18	9.5	10.5
Memphis, Tenn....	34.0	1	17.9	16, 18, 19, 20, 21	8.0	9.9
Vicksburg, Miss....	41.0	1	27.2	20, 21	9.7	17.5
New Orleans, La....	13.0	4	9.7	29	5.8	3.9
<i>Ohio River:</i>						
Pittsburgh, Pa....	22.0	19	12.2	16	3.2	9.0
Parkersburg, W. Va.	38.0	21	14.7	9	6.2	8.5
Cincinnati, Ohio....	50.0	24	23.8	12	12.5	11.3
Louisville, Ky....	25.0	25	9.6	7, 8	5.8	3.8
<i>Cumberland River:</i>						
Nashville, Tenn....	40.0	24	8.4	16, 17	3.2	5.2
<i>Tennessee River:</i>						
Knoxville, Tenn....	29.0	20	5.6	16	1.3	4.3
Chattanooga, Tenn.	33.0	23	6.9	9	4.0	2.9
<i>Monongahela River:</i>						
Pittsburgh, Pa....	29.0	19	12.2	16	3.2	9.0
<i>Savannah River:</i>						
Augusta, Ga....	32.0	18	19.3	9	8.9	10.4
<i>Willamette River:</i>						
Portland, Oregon....	15.0	19	5.7	1, 2	1.8	3.9

* 12 days record; river frozen remainder of the month.

ICE IN RIVERS AND HARBORS.

The following reports of Signal Service observers refer to the closing of navigation by ice on the Great Lakes and the more northerly rivers:

Lake Ontario.—Oswego, N. Y.: the schooner "Pictor," which left port on the 10th, was the last departure, and navigation is considered closed for the season. The canals were closed to navigation on the 3d.

Lake Erie.—Buffalo, N. Y.: navigation closed on the 15th, the steamer "Romania" being the last arrival of the season. Sandusky, Ohio: navigation practically closed on the 3th. Cleveland, Ohio, 8th: navigation has practically closed for the season. Toledo, Ohio: navigation at this port closed on the 3d, the steam barge "Bessie" being the last departure.

Lake Saint Clair.—Detroit, Mich.: the United States Lightship at Grassie Pointe Flats, Lake Saint Clair, was removed on the 7th, virtually closing navigation at this point.

Lake Michigan.—Manistee, Mich.: navigation was practically closed on the 1st, and entirely closed on the 15th. Green Bay, Wis.: the steamer "Welcome" arrived early on the morning of the 12th from down the bay. She was the last arrival of the season, and navigation is considered closed.

Lake Huron.—Alpena, Mich.: Thunder Bay was frozen over on the 20th; navigation closed.

Lake Superior.—Duluth, Minn.: navigation closed on the 2d, the propeller "Spokane" being the last departure.

Androscoggin River.—Lewiston, Me.: the river froze over on the 15th.—*Report of New England Meteorological Society.*

Baker's River.—Plymouth, N. H.: the river froze over on the 16th.—*Report of New England Meteorological Society.*

Merrimac River.—Newburyport, Mass.: the river froze on the 15th, and opened on the 31st.—*Report of New England Meteorological Society.*

Hudson River.—Poughkeepsie, N. Y., 14th: navigation on the river is about closed. Steamers of the Albany and Troy lines passed here on their last trip this evening going south. The ice at Castleton is fast, and all the bays and coves along the Hudson are frozen over.—*Baltimore Sun, December 15.*

Allegheny River.—Pittsburgh, Pa.: floating ice in river 14th to 18th, 21st to 25th, 27th to 31st.

Monongahela River.—Pittsburgh, Pa.: floating ice in river 20th, 23d to 25th, 27th, 28th.

Saint Clair River.—Port Huron, Mich.: navigation closed on the 11th; the steam barges "Romania" and "Australia" were the last boats to pass this point. Fort Gratiot light was discontinued on the 19th. Floating ice in river on the 22d; it was free from ice on the 25th.

Mississippi River.—Keokuk, Iowa: the Warsaw packet "Patience" went into winter quarters on the 18th, ending navigation for the season; floating ice in river 19th and 28th.